

Scope

This report presents the results of the subsoil investigation for the proposed solid waste disposal site on Illinois Central Railroad property near 130th Street and the Calumet Expressway, Chicago, Illinois.

The purpose of the investigation is to secure and log subsoil information, to record the geological nature, type, consistency and thicknesses of the various soil strata as encountered in the borings, to perform laboratory tests and to evaluate all of the data obtained in order to determine site feasibility for solid waste disposal purposes.

EPA Region 5 Records Ctr.



304138

Geology of Site and Soil Conditions

The site is located on man-placed fills which overlie lake-bottom soil deposits which in turn overlie soils of glacial origin.

Fills. The fills range from clay to heterogeneous rubble and refuse consisting of cinders, wood, garbage, paper, etc. Depths of the fill range up to 13.5 feet.

Organic soils. Occasionally, the original "topsoil" or surface soil horizon is encountered in the test borings. For the most part, however, the topsoil and underlying soils have been removed before placing of the fills. Topsoils appear as peaty soil deposits and, occasionally, a black loam.

Lake-Bottom Soils. In some of the test borings the natural sand soils were still in place below the fill. The sands are generally fine-grained, of loose density and saturated, being below the ground-water level. Occasionally, a layer of relatively soft lacustrine clay was noted in a boring.

Glacial Soils. Commencing near depths of 13 to 18 feet are glacial clay tills extending to depths of at least 80 feet (as determined in 2 of the borings). The glacial clays consist of several layers, the uppermost clay ranging in strength from about 2000 psf to 4000 psi. A second layer, somewhat stronger with strengths ranging from 3000 to 5000 psf is then encountered, with a hard clay encountered

Geology of Site and Soil Conditions (continued)Glacial Soils. Continued)

near the 48-foot depth. The fourth layer, the "hardpan" till was encountered below the 60-foot depth.

Conclusions

From data furnished to us, it is understood that the site is to be developed for solid waste disposal by excavating to near the 40-foot depth.

The test borings reveal the clay tills to extend to at least 40 feet below the proposed excavation depth. These clay tills are classed as highly impermeable soils capable of preventing flow of contained leachates of the fill into the underlying bedrock aquifer. The glacial tills are not expected to be homogeneous over the entire site area, however, as the tills occasionally contain silt or sand seams and pockets. If these silt or sand seams are encountered in excavating, it will be necessary to seal them with at least 5 feet of impermeable clay.

Where sand soils are above the clays, it will be necessary to seal them to prevent lateral flow of possible leachate in the fill. This lateral seal can be provided by constructing a clay wall of excavated clay soils. The wall liner must be well compacted, and a minimum thickness of 5 feet is recommended.

The clay soils of glacial origin are classed as impermeable soils. Although permeability tests are not a part of this report, coefficients of permeability of these clays generally are of the magnitude of  $5 \times 10^{-6}$  cm./sec. These clays should provide excellent cover for the fill as well as a good source of impermeable soils for liner construction.

Ground Water

Ground water was noted in all of the borings as indicated on the test boring logs.

In excavating, it will be necessary to provide drainage, or to cut off ground water

Ground Water (continued)

flow from the upper sand or fills. The excavation should be free from water prior to placing of fill.

Laboratory Tests

Tests performed on samples of the soils consisted of calibrated penetrometer tests. The results of these tests are entered on the soil boring logs.

Field Investigation

The field investigation was started on November 18, 1971 and completed on November 23, 1971. The test borings were made with a hollow stem auger type of drill rig utilizing split tube (ASTM D1586-64T) type of sampling at five-foot maximum intervals. Nine test borings were made. The soil types, nature, consistency, strata depths and thicknesses, and the sampling data were recorded on the field logs. In the split tube sampling, the standard penetration "N" (the number of blows of a 140-pound hammer dropping 30 inches to drive the standard 2-inch O.D. split tube) was recorded in 6-inch increments and entered on the field logs. Representative samples from the split tube were placed in jars, sealed and delivered to the laboratory for further classification and testing.

In the non-cohesive soils the hollow stem of the auger was used to prevent caving of the soils.

During drilling, immediately after completion of drilling, and 24 hours after completion of drilling, readings of the ground water were taken in the bore holes and the readings recorded on the boring logs.